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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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January 31, 1989

Mr. Allen S. Gordon
Manager of Engineering
Western States Minerals Corporation
4975 Van Gordon Street
Wheat Ridge, Colorado 80033

Dear Mr. Gordon:

Re: Mine and Reclamation Plan Review, Tug Project, M/003/007, Box Elder County, Utah

We have reviewed the revised Notice of Intention to Commence Large Mining Operations (NOI) which was received on October 26, 1988. This revision was submitted in response to the deficiencies the Division noted in the January 28, 1988 NOI. Although these deficiencies have been basically addressed, previous deficiencies defined by the Division in earlier correspondence have not been corrected. Additionally, there are several conflicts between the 10-28-88 NOI and the previously submitted technical memorandum. The following list of deficiencies and discrepancies must be corrected before the Division can grant tentative approval for the Tug Project:

(1) R613-004-110 Reclamation Plan, Soils

(a) On page 4 of the (10-26-88) NOI, WSMC has committed to salvaging 126,200 cubic yards of topsoil for use in final reclamation. This 126,200 cubic yards will be stripped from several areas totaling 78.2 acres.

The topsoil stripping map (12-24-84) indicates that a total of 268,600 cubic yards of topsoil will be salvaged. This 268,600 cubic yards was to be stripped from several areas totaling 115.5 acres.

The Division requires WSMC to submit a current topsoil stripping map that reflects the acreage and volume of the topsoil indicated in the NOI.

(b) On page 9 of the (10-26-88) NOI, WSMC plans on incorporating straw or hay mulch into the soil at the rate of two tons per acre. The operator also indicates that fertilizer is not necessary.

If the operator intends to use mulch, then fertilizer must be used in conjunction with this mulch. The minimum rate of application is 100 pounds per acre of an 18-46-0 fertilizer mix.

The Division requires WSMC to either (a), indicate a fertilization method and rate on page 9 of the NOI or (b), supply the Division with adequate soil analyses information to support the claim that fertilizer will not be needed.

(2) R613-004-112 Variances, Reclamation of Pit

(a) The variance for highwall slopes is approved with the following conditions:

1. If, during the life-of-mine or reclamation period, the highwalls show signs of toe failure, slope failure, or block flow, WSMC agrees to correct the problem by reducing the slope of the highwall to a 45 degree angle in the problem area. These corrected areas are subject to revegetation.

2. A rock safety berm will be constructed at the top of all highwalls where the slope of the highwall exceeds 45 degrees. This berm shall be large enough to prevent any vehicular access.

The Division requires WSMC to commit to these requirements by addressing them in the revised project description section of the MRP.

(b) The variance for pit revegetation is approved with the following conditions:

1. In addition to the access ramp into the pit, the roadways and final pad will be at a slope which will support revegetation.

2. The variance for pit reclamation will apply only to those areas where the slope of the highwall exceeds 45 degrees. All other areas, including the benches, must be revegetated.

The Division requires WSMC to address these conditions in the project description section of the MRP.

(3) R613-004-106 Operation Plan, Waste Rock

(a) The project description section of the MRP submitted by WSMC has conflicting language regarding the configuration of the waste dump slopes. Section 5.2 indicates the slopes will be left at the angle of repose. A variance will need to be requested if WSMC intends to leave the slopes at the angle of repose. On the other hand, Section 9 indicates the slopes will be graded to a 2.5:1 slope, which is acceptable to Division standards.

The Division requires WSMC to correct section 5.2 to agree with section 9.

(b) A chemical analysis was requested by the Division on the waste material to determine toxicity.

WSMC provided a single page analytical report, attached to the (10-26-88) NOI, showing water quality analysis.

The Division requires WSMC to provide a narrative describing the sampling method, along with the location and quantity of the samples taken. This narrative should be placed in the MRP, with adequate reference to the analytical report.

The Division would still like to see some type of evaluation performed on this material for potential acidity. This can either be accomplished by performing an acid-base analysis (neutralization potential), or total sulfur (potential acidity).

(4) R613-004-108 Hole Plugging Requirements

Numerous exploration holes have been drilled in the general area of the proposed mining operations. Several holes are located in the leach pad area. Division files indicate that only a small percentage of these holes have been reclaimed (i.e., plugged and covered). It is a generally accepted practice to allow holes to remain un-reclaimed if the holes will be located in an area that will be mined through (as is the case in open pit areas), or in areas where mining activity will cover the holes (as is the case in waste dump areas). These holes can only remain un-reclaimed if water was not encountered during drilling. In sensitive areas, where mining activity could potentially affect groundwater sources, exploration holes must be reclaimed immediately. This requirement applies even for those holes that do not encounter water. The leach pad area and processing ponds are considered sensitive areas. Therefore, all drill holes in these areas should be plugged prior to construction.

The Division requires WSMC to provide a list and map showing all drilling activity in the area. The list and map should show the reclaimed holes and the holes not reclaimed. It is suggested that the drill holes be plotted on the General Facilities Arrangement Drawing (04406/01).

(5) R613-004-107 Operation Practices, Hydrology

(a) The text description of the diversion channel conflicts with the General Facilities Arrangement Drawing (04406/01).

The Division requires the text to agree with the map. WSMC must provide corrected text and/or an updated map.

(b) In a previous Division technical comment (2-5-85), a map from WSMC was requested that would show proposed locations for all small dams and/or catch basins. The sizing calculations were also asked for. This material was not provided.

WSMC has indicated the need for sediment traps in Section 5.2 of the MRP. The Division requires an updated map, preferably using the General Facilities Arrangement Drawing (04406/01), showing all proposed erosion control and surface runoff protection structures. Calculations to substantiate these designs should be included in the MRP. Additionally, a commitment to install erosion/sediment controls around topsoil stockpiles should be included in the MRP. Suggested controls will allow vegetation to occur and may include such devices as silt fences, berms, and strawbales.

(c) The diversion ditch will concentrate runoff from an 800 acre watershed area. This runoff will enter an ephemeral wash. Without adequate erosion control devices, such as rip-rap, channel scour will likely result during significant precipitation events or spring snowmelt.

The Division requires WSMC to implement an erosion control device in this area. It should be included in the MRP and should be located on the General Facilities Arrangement Drawing (04406/01).

(d) In section 7.1 of the MRP, WSMC indicates several deep wells will be drilled as a water source for operations at the mine site.

The Division requires that these wells be located on the General Facilities Arrangement Drawing (04406/01). Additionally, the water supply piping system must be located on the map.

(6) Other Requirements

All final construction designs, as approved by the Division of Environmental Health, Bureau of Water Pollution Control (BWPC), must be provided to the Division. These approved designs include the heap leach pad, the solution pond liners, the leak detection systems, and any additional surface and ground water monitoring requirements imposed by BWPC. These plans should be referenced in the MRP as an attachment to the MRP.

WSMC indicated the desire to use part of the facility as a landfill. A copy of the agreement with Box Elder County should be attached to and referenced in the MRP.

The Division has recalculated the required reclamation surety. This figure of $400,000 (1993 dollars) is based on the (10-26-88) NOI. This amount is subject to change if significant alterations are made in the MRP. This reclamation estimate, showing direct comparison between WSMC and Division cost figures, is enclosed for your review.

Unfortunately, several review teams at the Division have been involved with this permit since the original NOI was submitted. The changes and ammendments made to the plan since the original submition have made this permit difficult, if not impossible, to follow. The best solution to correct this confusion is to have an updated MRP and all relating technical memorandum submitted. In its existing form, there are too many discrepancies in the MRP and technical memorandum to adequately replace on a page-by-page basis.

In your next response to Division deficiencies, be sure all deficiencies are adequately addressed and all re-submitted documents are in agreement with the maps and the (10-26-88) NOI. This will expedite Division approval for the Tug Mine. If you have any questions, do not hesitate to call me.

Sincerely,

Scott Johnson
Reclamation Engineer

jb
Enclosure

cc: Charles Dietz, BWPC
Jerry Mansfield, State Lands
Phil Dedycker, Envirocon
Lowell Braxton
Minerals Team
MN18/50-55

Reclamation Estimate for the TUG PROJECT
Western States Minerals Corporation
Box Elder County, Utah M/003/007

Prepared By
Utah State Division of Oil, Gas and Mining
December 21, 1988

Description	1988 WSMC Calculation			1988 DOGM Calculation		
	Acres	$/acre	Total $	Acres	$/acre	Total $
A. Removal of Structures and Equipment (a)						
1. Remove Generator Sets			500			500
2. Remove Plant Equipment			9,000			9,000
3. Remove Portable Crusher			1,700			1,700
4. Remove Buildings and Trailers			11,900			11,900
Subtotal			23,100			23,100
B. Heap Decommissioning (a)	20.3	2,300	46,700	20.3	2,300	46,700
C. Pond Removal Including Liner and Sludge Disposal (a)	1.6	5,000	8,000	1.6	5,000	8,000
D. Earthwork to Final Grade (b)						
1. Contour Leach Pad Area	20.3	591	12,000	20.3	780	15,800
2. Contour Pond Area	1.6	1,875	3,000	1.6	1,560	2,500
3. Contour Waste Dumps	28.5	1,053	30,000	28.5	780	22,200
4. Contour Diversion Ditch	0.8	4,500	3,600	3.1	1,560	4,800
5. Contour Pit Area (c)				4.9	780	3,800
6. Contour Ore Stockpile (d)				2.7	780	2,100
7. Rip Roads at Minesite				2.2	275	600
	51.2	949	48,600	63.3	818	51,800
E. Fencing @ $3.00/foot (e)			10,800			17,000
F. Foundation Removal and Disposal (a)			9,000			9,000
G. Miscellaneous Clean-up (f)			1,100	53.2	100	5,300
H. Topsoil Replacement (g)	85.0	1,489	126,565	73.1	1,750	127,900

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Description	1988 WSMC Calculation Acres	$/acre	Total $	1988 DOGM Calculation Acres	$/acre	Total $
I. Stabilization						
1. Reseeding	85.0	342	29,070	90.0	286	25,700
2. Mulching (h)	85.0	175	14,875	90.0	195	17,600
Subtotal		517	43,945		481	43,300
Total			317,810			332,100
Add Contingency (10%)			31,781			33,200
TOTAL RECLAMATION COST (1989 Dollars)	85.0	4,110	349,591	90.0	4,060	365,300
TOTAL RECLAMATION COST (1993 Dollars @ 2.3% Annual Inflation) (i)				90.0	4,440	400,000

(a) Estimates supplied by Western States Minerals are acceptable.

(b) The Division bases earthwork on an average regrading depth of 1 foot for general regrading work, and 2 feet for fill and regrading work.

(c) 65% of the pit area can be regraded to a slope which will support vegetation.

(d) Assuming the ore stockpile is remaining at time of closure.

(e) Western States Minerals estimates a 3600' fenceline; however, the WSM drawing number 04406/01 (General Facilities Arrangement) shows a 5680' fenceline.

(f) The Division uses $100/acre as an average sum for trash and debris removal.

(g) Based on a topsoil stockpile of 126,200 cubic yards.

(h) Fertilizer must be used in conjunction with mulch.

(i) The total mine life is projected to be 4 years, including 1 year for heap leach decommissioning and mine reclamation.

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Cost Parameters Used

621B Scraper (O&O)	150	$/hour
Production	200	Cubic Yards/hour
D-8 Dozer (O&O)	160	$/hour
Production	300	LCY/hour
Speed w/ripper	1	mph
Grading at 12 inch depth	780	$/acre
Rip roads at 1 foot depth	275	$/acre
Labor Only	24	$/hour
Trash Removal	100	$/acre
Farm Tractor (O&O)	67	$/hour
Speed	4	mph
Width of Pass	6	feet

Revegetation Cost per Acre	Amount	Unit	Unit Cost	Total Cost ($)
Bare Costs				
Fertilizer (18-46-0)	100	Pounds	0.25	25
Seed Mix	20	Pounds	10.70	214
Native Hay Mulch	2	Tons	50	100
Subtotal				339
Application Costs				
Native Hay Mulch (spread by hand)	3.0	Hours	24	72
Native Hay Mulch (disc into ground)	0.3	Hours	67	23
Fertilizer (broadcast by hand)	0.5	Hours	24	12
Seed Mix (broadcast by hand or drilled)	0.5	Hours	24	12
Scarify (tractor with chain)	0.3	Hours	67	23
Subtotal				142
Total Revegetation Cost per Acre				481